

FIGS. 1A to 1C are cross-sectional views illustrating a conventional method of manufacturing a semiconductor device having a self-aligned contact structure.

FIGS. 2A to 2F are cross-sectional views illustrating a method of manufacturing a semiconductor device according to one embodiment of the present invention.

5 FIGS. 3A and 3B are cross-sectional views illustrating a method of manufacturing a semiconductor device according to another embodiment of the present invention.

FIG. 4 is a cross-sectional view illustrating a DRAM device according to one embodiment of the present invention.

10 FIGS. 5A to 5H are cross-sectional views illustrating a method of manufacturing the DRAM in FIG. 4.

FIGS. 6A and 6B are cross-sectional views illustrating a method of manufacturing a DRAM device according to still another embodiment of the present invention.

FIGS. 7A to 7D are cross-sectional views illustrating a method of manufacturing a DRAM device according to still another embodiment of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

The invention now will be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to
20 the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those of ordinary skill in the art. In the drawings, like reference characters refer to like element throughout.

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EMBODIMENT 1

FIGS. 2A to 2F are cross-sectional views illustrating a method of manufacturing a semiconductor device according to a first embodiment of the present invention.

Referring to FIG. 2A, a first insulating film 52, a conductive film 53, and a second insulating film 55 are successively formed on a semiconductor substrate 50. That is, a silicon
30 oxide based material is deposited on the semiconductor substrate 50 to form the first insulating film 52, and then the conductive film 53 is formed on the first insulating film 52. Preferably, the conductive film 53 includes a composite film that has a first film composed of a first metal and/or a compound of the first metal, e.g., titanium (Ti) /titanium nitride (TiN), and a second